[illegible]

[illegible] ——[illegible]

[illegible],[illegible],[illegible]

$$H_2 + I_2 \rightleftharpoons 2HI$$

[illegible]:[illegible]

[illegible]

[illegible]

1mol H_2 [illegible] 1mol I_2 [illegible] 2mol HI [illegible]

思考与交流

[illegible]“[illegible]”[illegible]

(1) [illegible] H_2+O_2 [illegible]

(2) [illegible]

(3) CO_2 [illegible] H_2O [illegible] CO_2 [illegible] H_2O [illegible]

[illegible]:

$N_2+3H_2 \underset{\text{[illegible]}}{\overset{\text{[illegible]}}{\rightleftharpoons}} 2NH_3$

$2SO_2+O_2 \underset{\text{[illegible]}}{\overset{\text{[illegible]}}{\rightleftharpoons}} 2SO_3$

$SO_2+H_2O \rightleftharpoons H_2SO_3$

$2NO_2 \rightleftharpoons N_2O_4$

□□□

1. $^{14}CO_2$ □ C □□□□□□□□□□ $^{14}CO_2$ + C ⇌ 2CO □□□

□□□□□□□□□□□□□□□□□ ^{14}C □□□□□　　□　　　　C

　A □ $^{14}CO_2$　　　　　　　　B □ $^{14}CO_2$ □ ^{14}CO

　C □ $^{14}CO_2$ □ ^{14}CO □ ^{14}C　　　D □ ^{14}CO

2. □□□□□□□□□□□□ X_2+Y_2 ⇌ 2Z □□□□□□

X_2 □ Y_2 □ Z □□□□□□□□□□ 0.1mol/L □ 0.3mol/L □

0.2mol/L □□□□□□□□□□□□□□□□□□□□

□□□□□□□□□□□ (　　)　　B

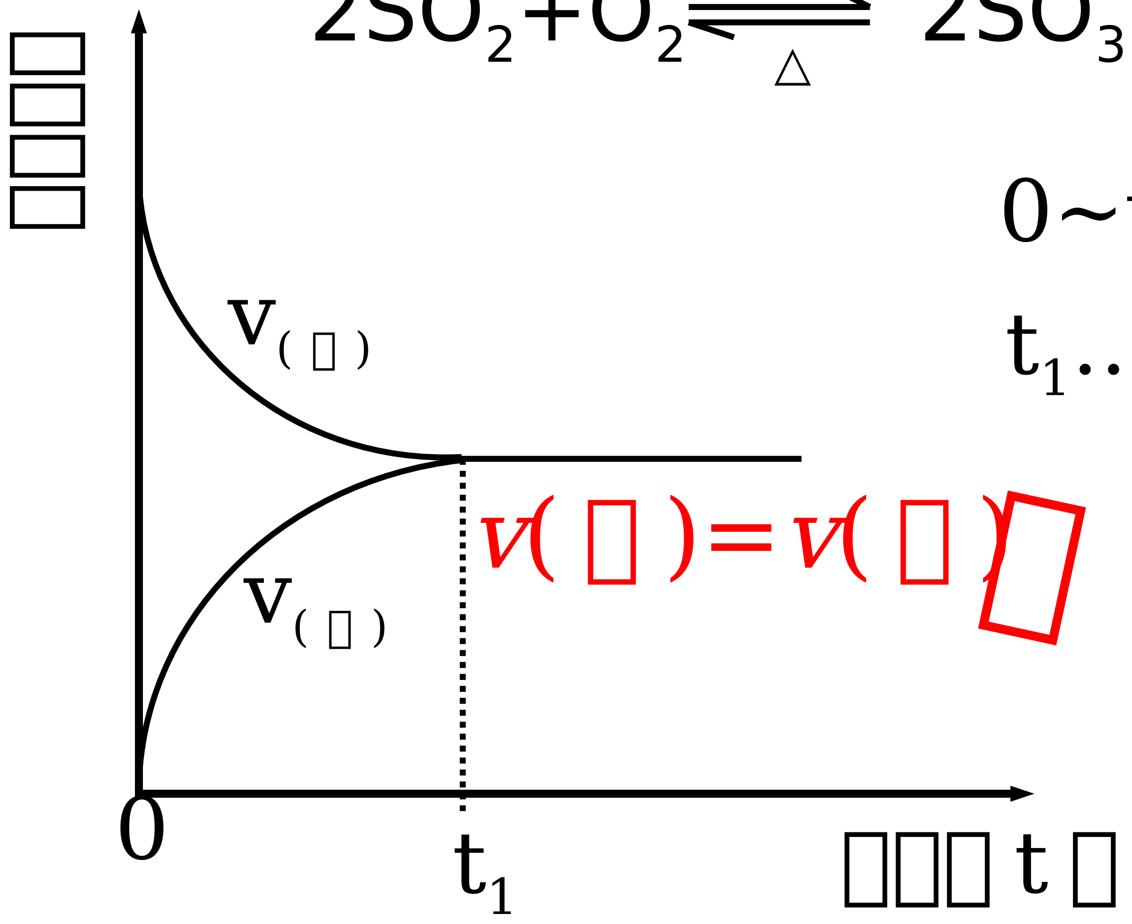
A. $c(X_2)=0.2mol/L$　　　B. $c(Y_2)=0.35mol/L$

C. $c(Y_2)=0.2mol/L$　　　D. $c(Z)=0.4mol/L$

[illegible]——[illegible]

1 [illegible]

$$2SO_2 + O_2 \underset{\triangle}{\overset{\text{[illegible]}}{\rightleftharpoons}} 2SO_3$$



v([illegible])=v([illegible]) [illegible]

$0 \sim t_1$ [illegible] $v_{(\text{[illegible]})} > v_{(\text{[illegible]})}$

$t_1 \ldots$ [illegible] $v_{(\text{[illegible]})} = v_{(\text{[illegible]})}$

[illegible]

$$2SO_2+O_2 \underset{\triangle}{\overset{□□□}{\rightleftharpoons}} 2SO_3$$

□□□□□□□□□□

1□$v_{□}$□$v(O_2)_{□}$　　$v(SO_3)_{□}$

2□$v_{□}$□$v(O_2)_{□}$　　$v(SO_3)_{□}$

3□$v_{□} = v_{□}$

①□□□□□□□

②□□□□□□□

2 [illegible]

[illegible]：[illegible]

[illegible]

[illegible] v([illegible])= v([illegible]) ≠0 → [illegible]

[illegible]

3 [illegible]

[illegible]**：** [illegible]——[illegible]

[illegible] v([illegible]) $=$ v([illegible])

[illegible] v([illegible]) $=$ v([illegible]) $\neq 0$ [illegible]

[illegible]

[illegible]

[illegible]

[illegible] 1 [illegible] （ ） A

A [illegible]

B [illegible] 0

C [illegible]

D [illegible]

□□2.□□□□□□□□□□□□□□□□M□N□□□□□□□□□□□□□□□□□
□□□□□□□□□□□　　□

CD

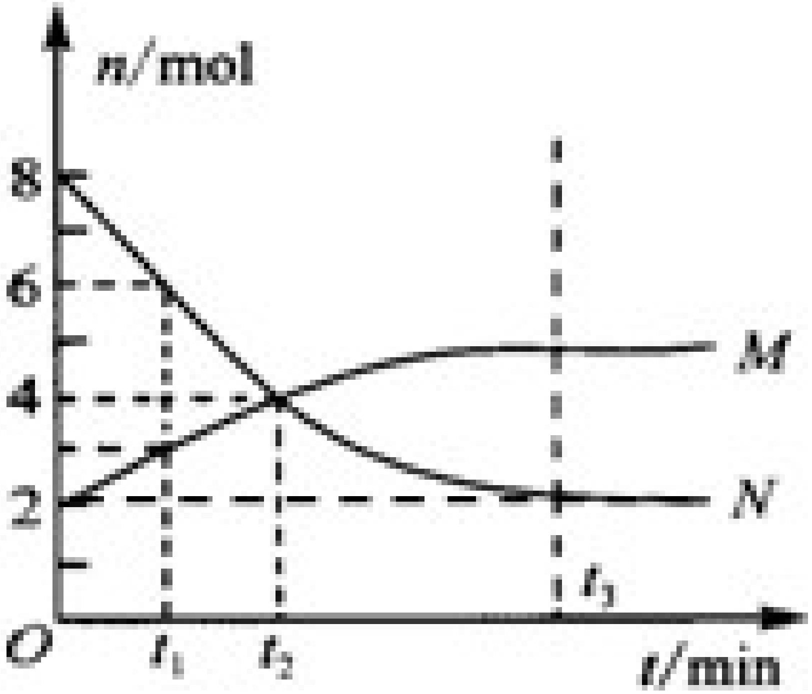
A.　□□□□□□□□□2M ⇌N

B□t_2 □□□□□□□□□□□□□□□□□

C□t_2 □□□□□□□□□□□□□□□

D□t_1 □□N□□□□M□□□2□

E.　t_3 □□□□□□□□□□□□□□□



4 □□□□□□□□□□□□□

□1□□□□□□

①“□”□ v(□)=v(□) ≠0

②“□”□□□□□□□□□□□□□□

□2□□□□□□

“□□□□”

□□□□□□

① □□□□

② □□□□□□□□□□□□□

③ □□□□

④ □□□□□□□□

[illegible] $N_2 + 3H_2 \rightleftharpoons 2NH_3$ [illegible]

[illegible] ________ **c h i k l**

a. $3v(N_2) = v(H_2)$

b. $2v(N_2)$ [illegible] $= v(NH_3)$ [illegible]

c. $2v(N_2)$ [illegible] $= v(NH_3)$ [illegible]

d. [illegible] 3molH_2 [illegible] 3molN_2

e. [illegible] 3molH_2 [illegible] 2molNH_3

~~f. N_2 [illegible] H_2 [illegible] NH_3 [illegible]~~

~~g. N_2 [illegible] H_2 [illegible] NH_3 [illegible] 1:3:2~~

h. NH_3 [illegible]

i. [illegible]

j. [illegible]

k. [illegible]

L. [illegible]

[illegible]1.[illegible]A(s)+2B(g)⇌2C(g)[illegible]　[illegible]

B

[illegible]1[illegible]$v_{[illegible]}$(B)[illegible]$v_{[illegible]}$(C)[illegible]

[illegible]2[illegible]n(B)[illegible]n(C)=1:1 [illegible]

[illegible]3[illegible]

[illegible]4[illegible]

[illegible]5[illegible]

A[illegible]2[illegible]3[illegible]4[illegible]5[illegible]　　B[illegible]2[illegible]3[illegible]

C[illegible]2[illegible]3[illegible]4[illegible]　　D[illegible]2[illegible]3[illegible]5[illegible]

2. [illegible] $A_2(s) + 3B_2(g) \rightleftharpoons 2AB_3(g)$ [illegible]

C

[illegible]

① [illegible]

② [illegible]

③ [illegible]

④ [illegible]

⑤ [illegible]

A ①②③　　B ①②③④

C ①②③④⑤　　D ①②③⑤

3. [illegible]

① [illegible]

② [illegible]

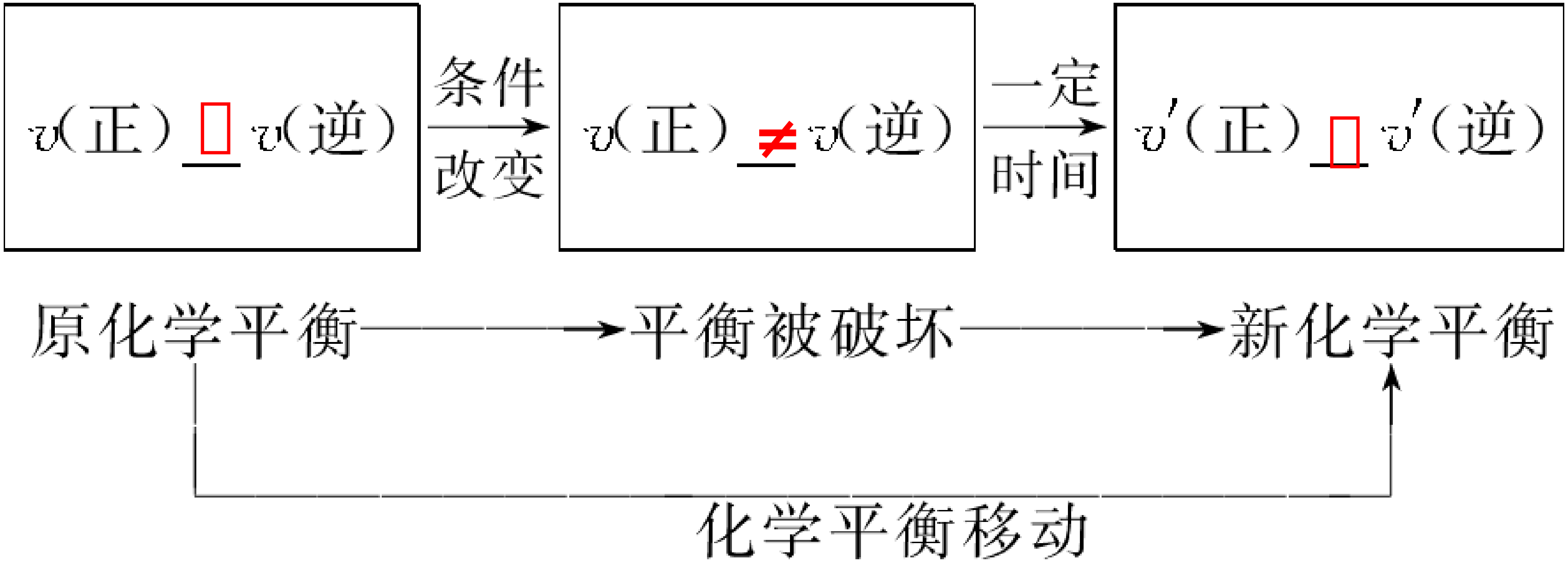
③ [illegible]

④ [illegible]

⑤ [illegible]

[illegible] $\mathbf{NH_2COONH_4(s) \rightleftharpoons 2NH_3(g)}$ [illegible] $\mathbf{CO_2(g)}$ [illegible]

[illegible] ____①②③____ [illegible]



v(正)____v(逆)
条件
改变
v(正)≠v(逆)
一定
时间
v′(正)____v′(逆)
原化学平衡
平衡被破坏
新化学平衡
化学平衡移动

[illegible] υ' [illegible] υ' [illegible]

[illegible]

[illegible]

① [illegible] υ' [illegible] υ' [illegible]

② [illegible] υ' [illegible] υ' [illegible]

③ [illegible] υ' [illegible] υ' [illegible]

[illegible] υ' [illegible] υ' [illegible]

[illegible]

[illegible]

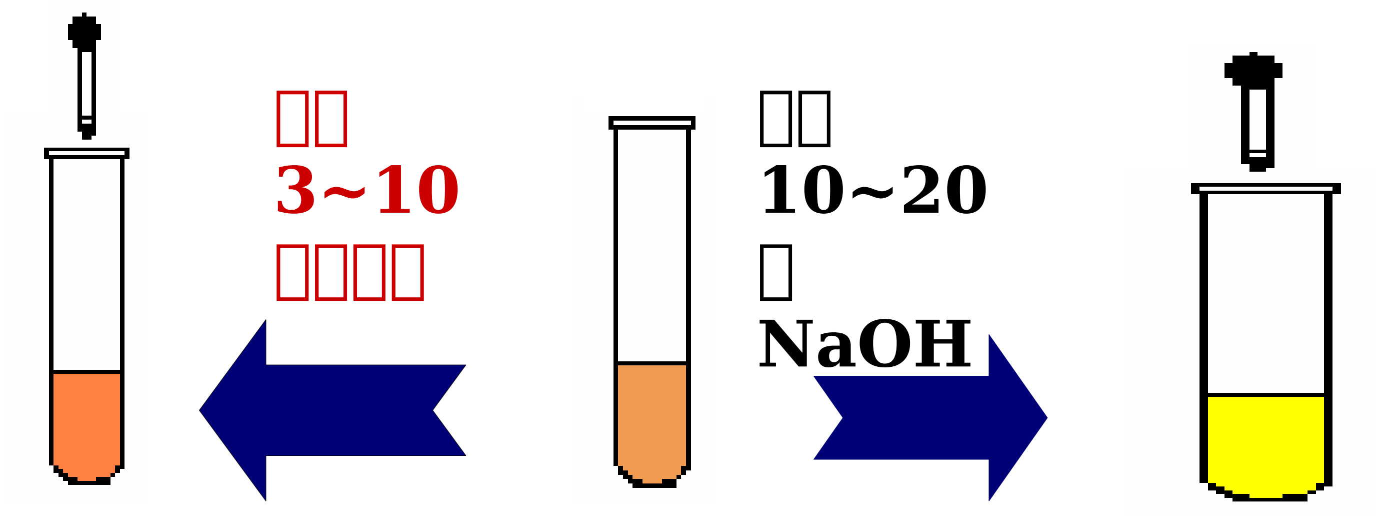
[illegible]

[illegible]

□□ 2-5 □□□□ $K_2Cr_2O_7$ □□□□□□□□□□

$$Cr_2O_7^{2-}(□□) + H_2O \rightleftharpoons 2\ CrO_4^{2-}(□□) + 2H^+$$

□□	1	2
□□	□□ 5~15 □□□□	□□ 5~15 □ NaOH
$K_2Cr_2O_7$ □□	□□□□	□□□□



[illegible] 2-6 [illegible]

$Fe^{3+}+3SCN \rightleftharpoons Fe(SCN)_3$ ([illegible])

[illegible] 1 [illegible] $FeCl_3$ [illegible]——[illegible]

[illegible] 2 [illegible] 1mol/LKSCN [illegible]——[illegible]

[illegible] 1 [illegible] 2 [illegible] NaOH [illegible]

[illegible]

1. [illegible]

[illegible]

1. [illegible]
2. [illegible]

[illegible] [illegible]

3. [illegible]
4. [illegible]

[illegible]

[illegible]

① [illegible]

② [illegible]

[illegible]

[illegible]

[illegible]

[illegible] SO_2 [illegible]

$$2SO_2(g)+O_2(g) \rightleftharpoons 2SO_3(g)$$

[illegible] O_2 [illegible]　　　[illegible] SO_3 [illegible]

2. [illegible]—[illegible]

[illegible]

A [illegible]

B [illegible]

[illegible] **1** [illegible] $2SO_2(g)+O_2(g) \rightleftharpoons 2SO_3(g)$

[illegible] 1. [illegible] — [illegible]

2. [illegible] — [illegible]

[illegible]

[illegible]2[illegible] $H_2(g)+I_2(g) \rightleftharpoons 2HI(g)$

[illegible]?　　—[illegible]　　[illegible]

[illegible]

[illegible]

1. [illegible]

[illegible]

2. [illegible]

[illegible]

[illegible]

[illegible]

a [illegible]

b [illegible]

[illegible] 1 [illegible]

① $2NO(g) + O_2(g) \rightleftharpoons 2NO_2(g)$ [illegible]

② $H_2O(g) + CO(g) \rightleftharpoons CO_2(g) + H_2(g)$ [illegible]

③ $H_2O(g) + C(s) \rightleftharpoons CO(g) + H_2(g)$ [illegible]

④ $CaCO_3(s) \rightleftharpoons CaO(s) + CO_2(g)$ [illegible]

⑤ $H_2S(g) \rightleftharpoons H_2(g) + S(s)$ [illegible]

[illegible]②[illegible]⑤[illegible]

[illegible] 2 [illegible]

$$CO_2(g)+C(s) \rightleftharpoons 2CO(g)$$

[illegible]

[illegible] 1 [illegible] ______ ; $c(CO_2)$ ______ [illegible]

[illegible] [illegible]

[illegible] 2 [illegible] N_2 [illegible] ______ ;

$c(CO_2)$ ______ [illegible]

[illegible] [illegible]

[illegible] 3 [illegible] N_2 [illegible] ______ ;

$c(CO_2)$ ______ [illegible]

[illegible] [illegible]

[illegible] 4 [illegible] C [illegible] ______ [illegible] ;

$c(CO_2)$ ______ [illegible] ______ [illegible]

□□3□□□□，□□ $aX(g) \rightleftharpoons bY(g) + cZ(g)$ □□□□□，□□□□□□□□□□□□□□，□□□□□□X□□□□□□□□□0.1mol/L□□□0.19mol/L，□□□□□□□□□□ □

A. a □ b+c

B. a □ b+c

C. a □ b+c

D. a □ b=c

A

[illegible] **4:**

[illegible] **2A(?)+B(g)=2C(?)** [illegible]

[illegible] [illegible]

D

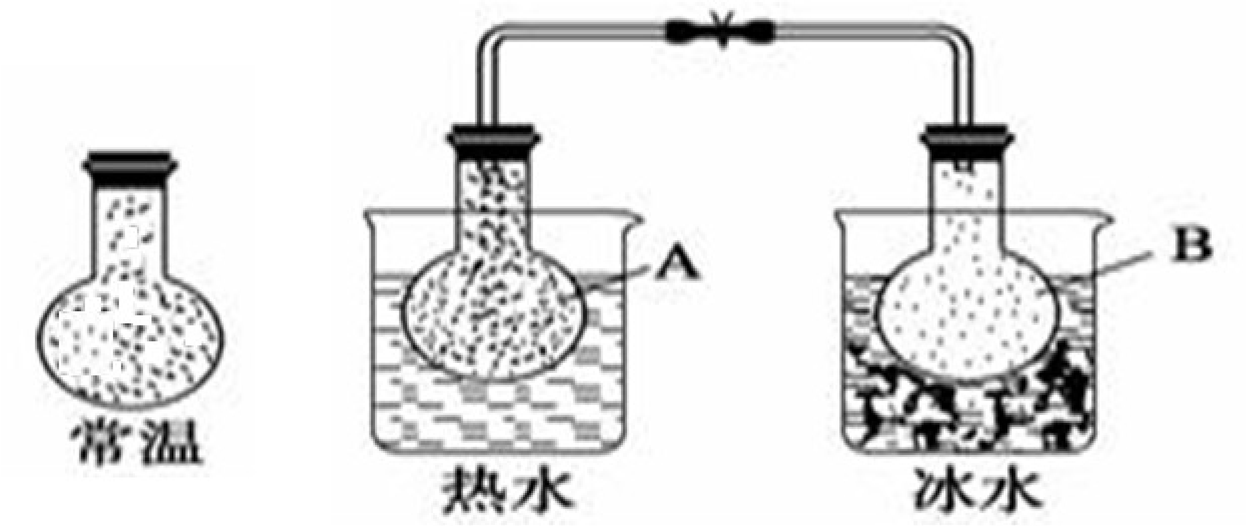
A: A [illegible] **C** [illegible]

B: A [illegible] **C** [illegible]

C: A [illegible] **C** [illegible]

D: A [illegible] **C** [illegible]

3. [illegible] $2NO_2(g) \rightleftharpoons N_2O_4(g)$ [illegible] $\Delta H<0$ [illegible]



[[illegible]] A [illegible]：[illegible] ①______________

NO_2 [illegible]

___[illegible] ②______ [illegible] ______[illegible]

B [illegible]：[illegible] ①______________

NO_2 [illegible]

_____[illegible] ②______ [illegible] ______[illegible]

[[illegible]] [illegible]

A [illegible]

B [illegible]

[illegible]

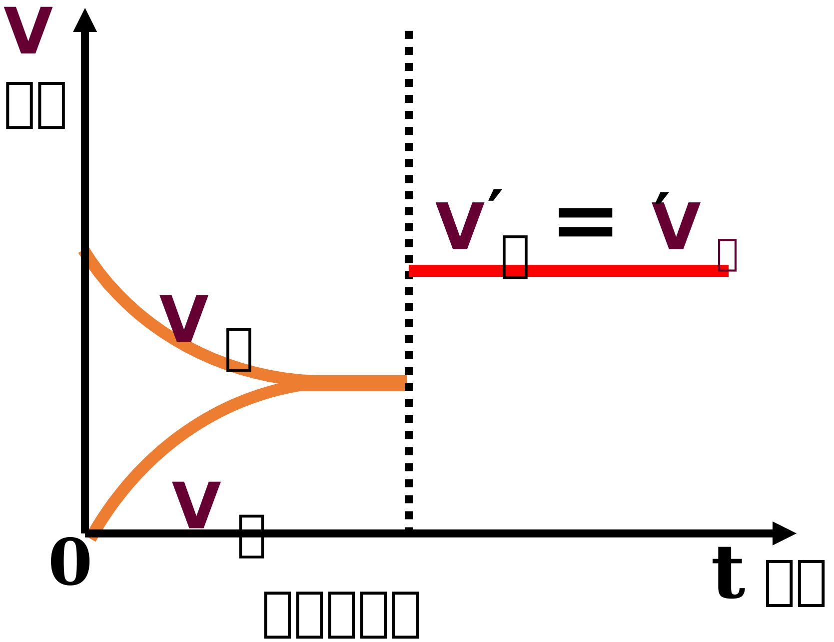
[illegible] **$2NO_2(g) \rightleftharpoons N_2O_4(g)$** [illegible] **$\triangle H<0$** [illegible]

[illegible] $2HBr(g) \rightleftharpoons H_2 + Br_2(g)$ [illegible]△H >0 [illegible]（ ）

BC

A [illegible] B [illegible] C [illegible] D [illegible] H_2 [illegible]

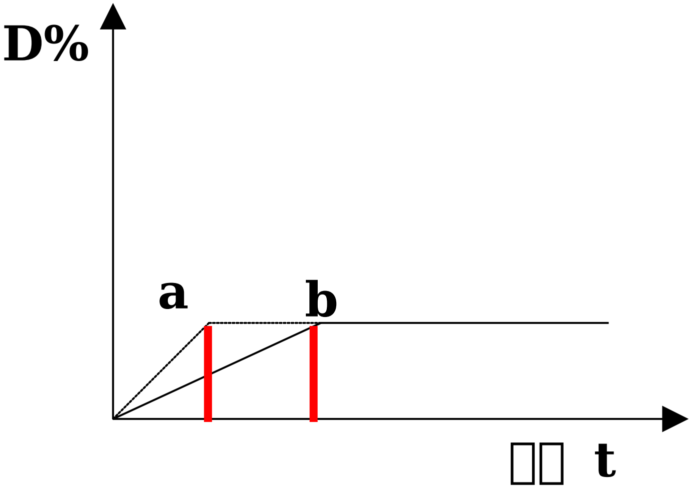
4.



□□． □□□□ 3A(g) + B(g) ⇌ C(s) + 4D(g) △H <0

□□□ a □ b □□□□□□□ D □□□□□□□ t □□□□□□□□□□ **D** b □

□□□ a □□□□□□□□ □



①

② □□ B □□□

③ □□□□□□

④ □□□□□□□□□

□□□□□

A. ①② ①③ B. ②③ C. ③④

D.

[[illegible]] [illegible]

[illegible]		[illegible]
①	[illegible]	[illegible]
	[illegible]	[illegible]
②	[illegible]	[illegible]
	[illegible]	[illegible]
③	[illegible]	[illegible]
	[illegible]	[illegible]
④	[illegible]	[illegible]

[illegible] 1 [illegible] D

A . [illegible]

B. [illegible]

C. [illegible] NH_3 [illegible]

D. [illegible] $FeSO_4$ [illegible]

□□2

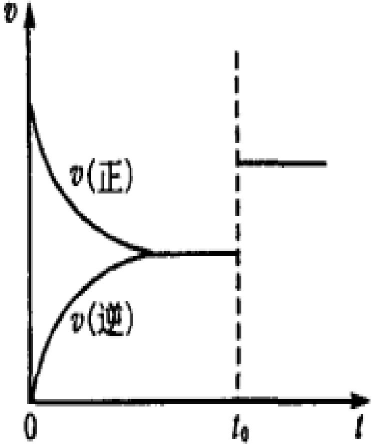
可逆反应 aX（g）+bY（g）$\rightleftharpoons$cZ（g）在一定温度下的一密闭容器内达到平衡后，t_0时改变某一外界条件，化学反应速率（v）—时间（t）图象如右图。则下列说法中正确的是（　　）

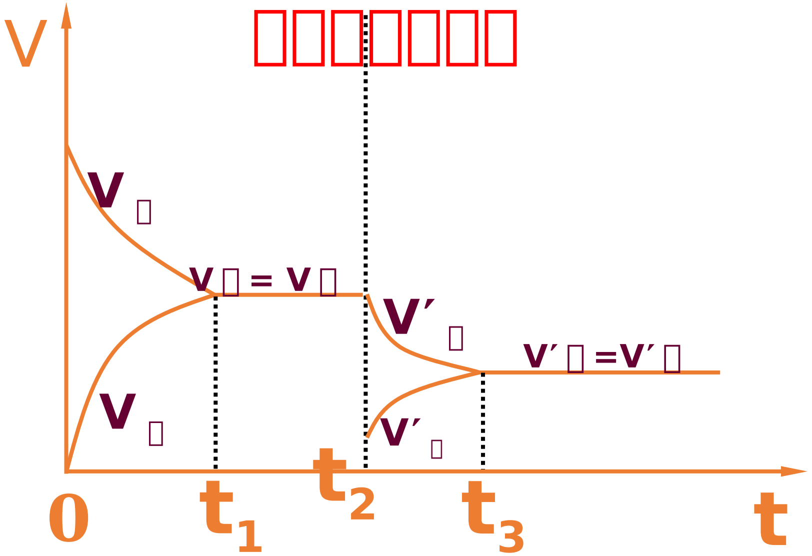
A 若 a+b=c，则 t_0时只能是增大了容器的压强

B 若 a+b=c，则 t_0时只能是加入了催化剂

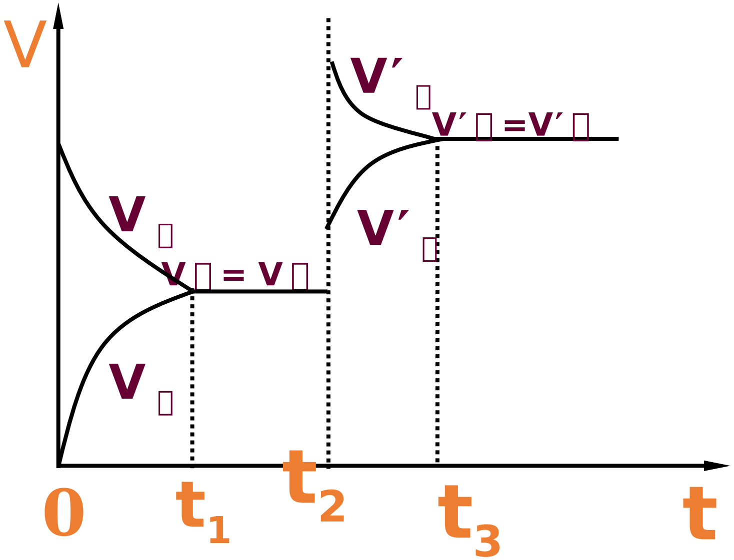
C 若 a+b≠c，则 t_0时只能是增大了容器的压强

D 若 a+b≠c，则 t_0时只能是加入了催化剂



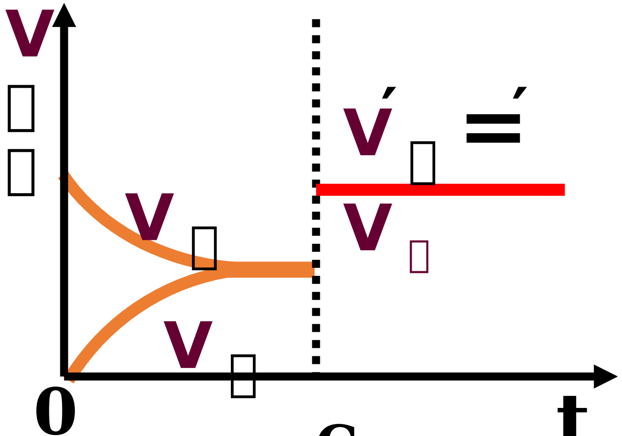


A



B

$\triangle H<0$



c

[illegible]$N_2+3H_2 \rightleftharpoons 2NH_3$ $\triangle$**H<0**

[illegible] ***v*-t** [illegible]

① [illegible] ② [illegible]

③ [illegible] ④ [illegible]

⑤ [illegible] ⑥ [illegible]

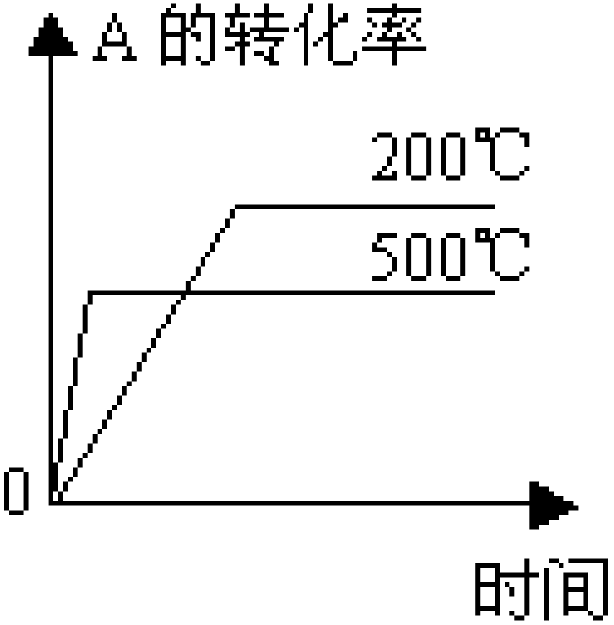
⑦ [illegible] ⑧ [illegible]

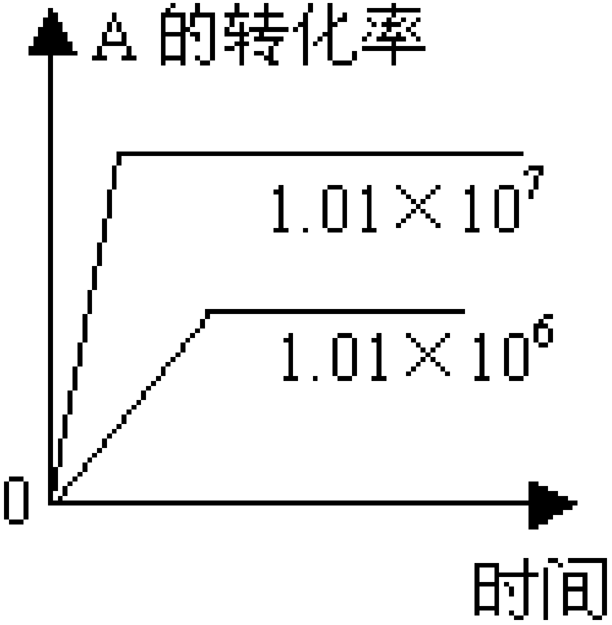
⑨ [illegible]

$mA(g)+nB(g) \rightleftharpoons pC(g)+qD(g)$ △*H*

m+n __?__ p+q　　△*H* __?__ 0

1

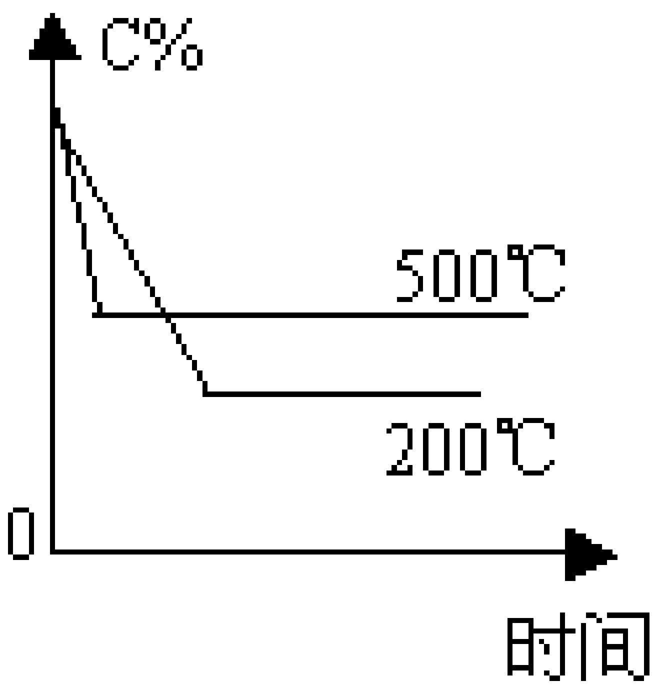


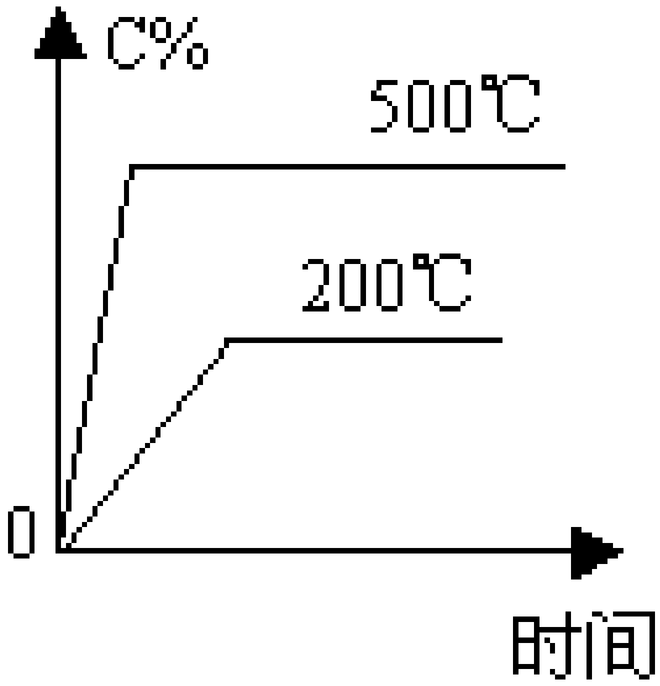


P一定时，△*H* __<__ 0　　T一定时，m+n __>__ p+q

mA(g)+nB(g) ⇌ pC(g)+qD(g) □△*H*

2 □□□□□□ □□

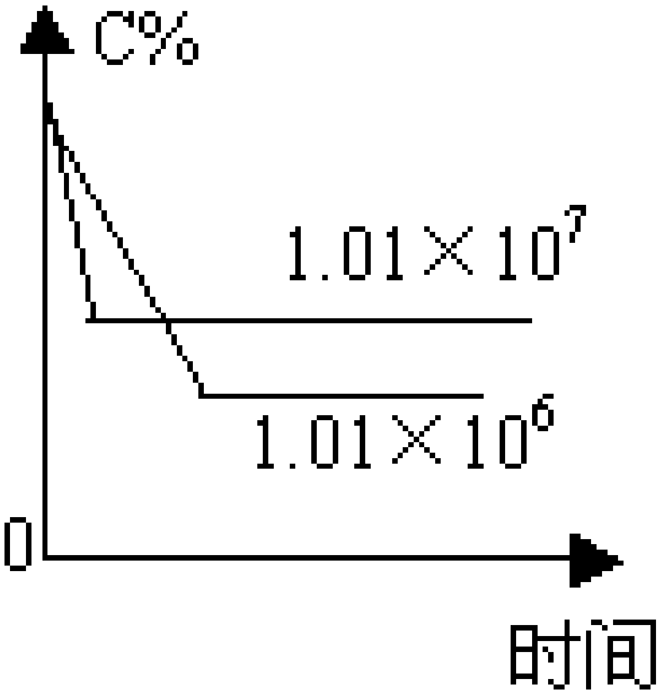


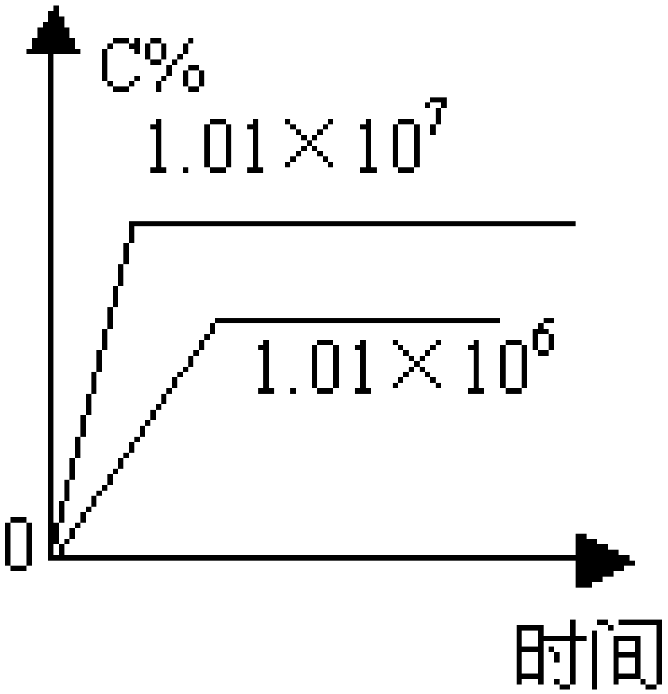


P一定时，△***H*** __>__ **0**

P一定时，△***H*** __>__ **0**

$mA(g)+nB(g) \rightleftharpoons pC(g)+qD(g)$ △*H*

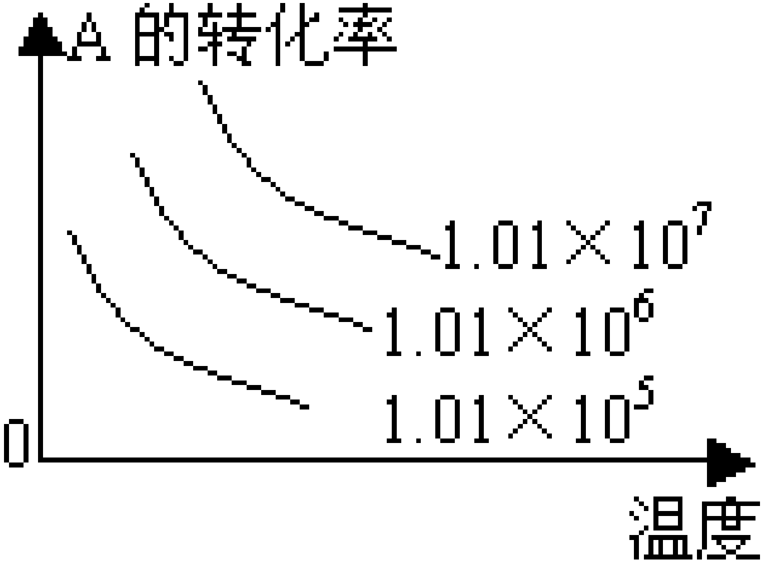




T 一定时**m+n ≥ p+q**　T 一定时，**m+n ≥ p+q**

$$mA(g)+nB(g) \rightleftharpoons pC(g)+qD(g) \quad \triangle H$$

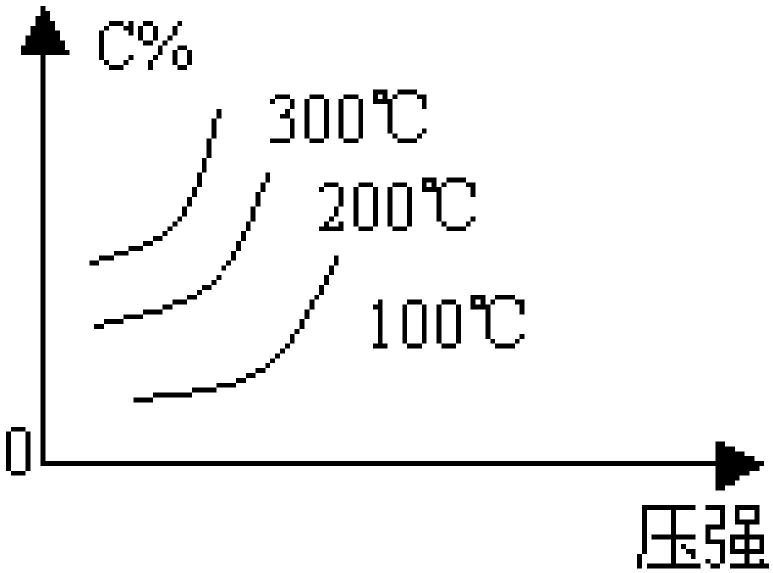
3

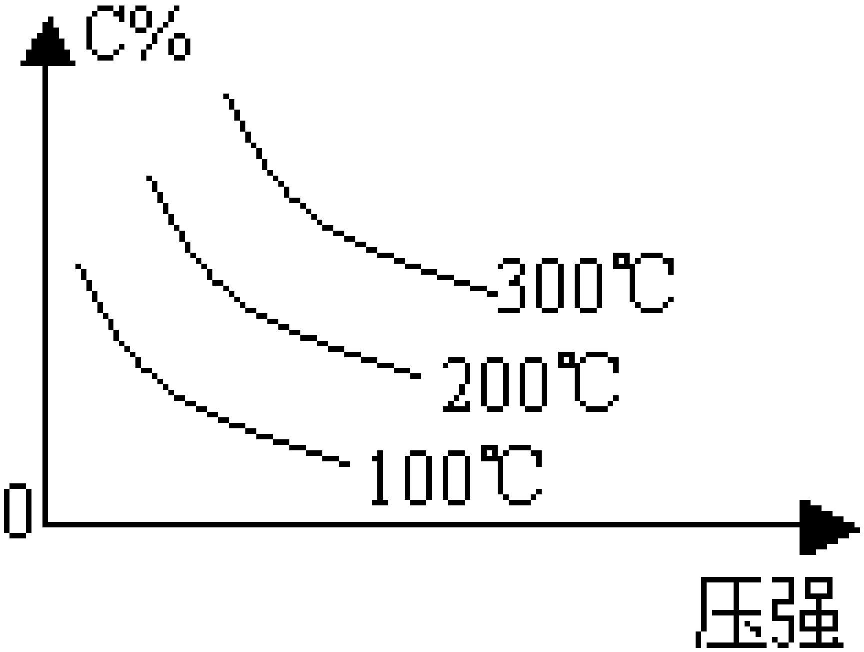


$m+n$ _>_ $p+q$ $\triangle H$ _<_ 0　　$m+n$ _<_ $p+q$ $\triangle H$ _>_ 0

mA(g)+nB(g) $\rightleftharpoons$ pC(g)+qD(g) □△*H*

4 □□□□□□□□□ □□

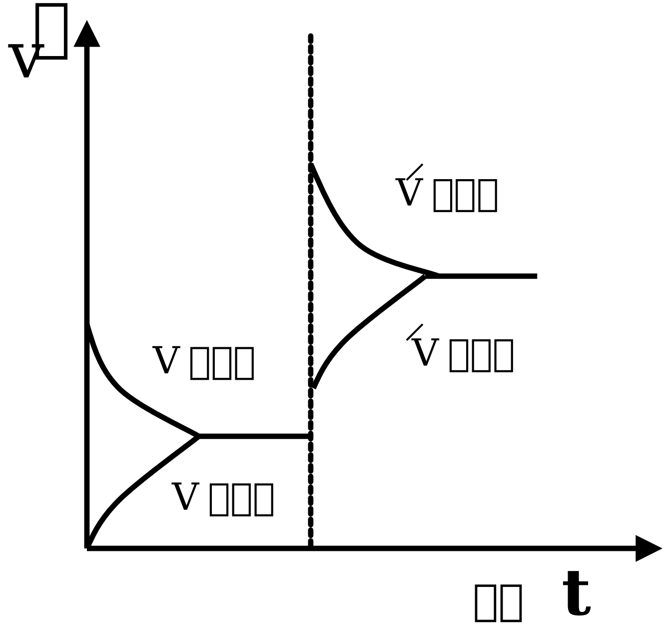




m+n__>__p+q △*H* __>__0 **m+n__<__p+q △*H* __>__0**

□□□ 1

1. □□□□□□□□□□□□: X+Y $\rightleftharpoons$ W+Z □□□□
□□□□□□□□□□□□□□□□
□□□□□□ X□Y□W□Z□□□
□□□ B□ □



A. Z□W □□□□□ X□Y □□□□□□□

B. ~~Z□W □□□□□□□□ X□Y □□□□~~

C. X□Y□Z □□□□□□ W □□□

D. X□Y □□□□□ Z□W □□□□□

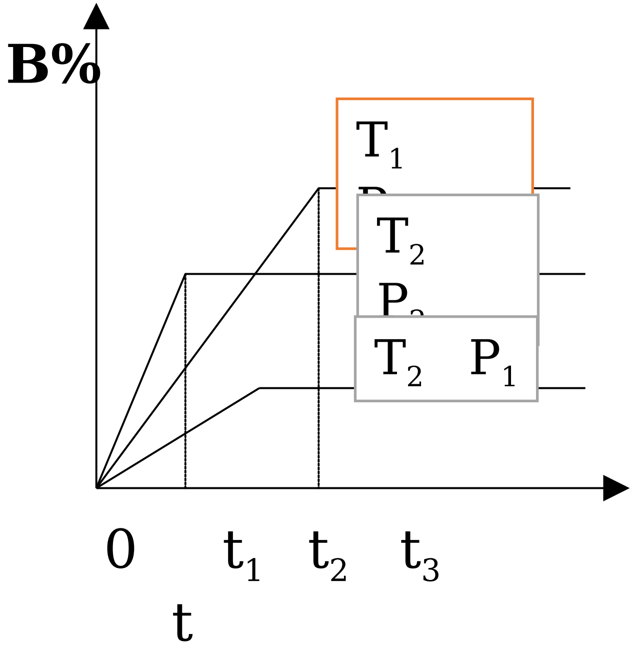
[illegible] 2

2. [illegible]

$m\,A(g) + n\,B(g) \rightleftharpoons p\,C(g)$ $\triangle H$

[illegible] **t** [illegible] **T** [illegible] **p** [illegible] **B** [illegible] **B%** [illegible]

[illegible] C [illegible]



A. $T_1 < T_2$ $p_1 < p_2$ $m+n < p$ $\triangle H<0$

B. $T_1 < T_2$ $p_1 > p_2$ $m+n > p$ $\triangle H>0$

C. $T_1 < T_2$ $p_1 < p_2$ $m+n < p$ $\triangle H>0$

D. $T_1 > T_2$ $p_1 < p_2$ $m+n < p$ $\triangle H<0$

□□□ 3

3. $m\,A(s) + n\,B(g) \rightleftharpoons p\,C(g)$

□□□□□□□□□□□□□ B □□□□ B% □□□□□□□□□□

□□□□□□□□ □ **C**

A. m + n > p

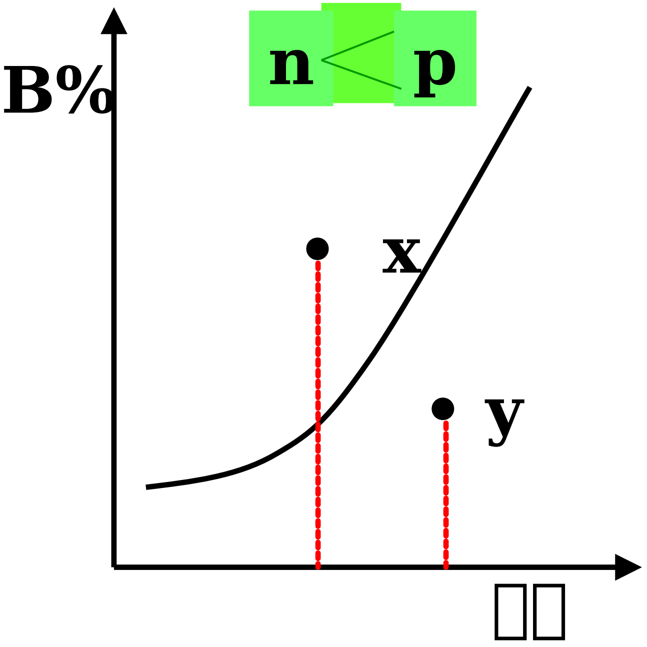
B. > n p

C. x □□□□□□□□

> v□ v□

D. x □□□□ y □□□

□□□□□□□□□



□□□□□□□□□□

1. □□□□□□□□□□□□□□□□□□□□**X**□**Y**□□□□□**$mX(g)\rightleftharpoons nY(g)$△H=QkJ/mol**□ □□□□□□□□**Y**□□□□□□□□□□□□□□□
□□□□□□□□□□
□□□□□□□□□ □ **C**

A. m □ n **B.** ΔH □ 0

C. □□□□□□□□□□**Y**□□□□□□□

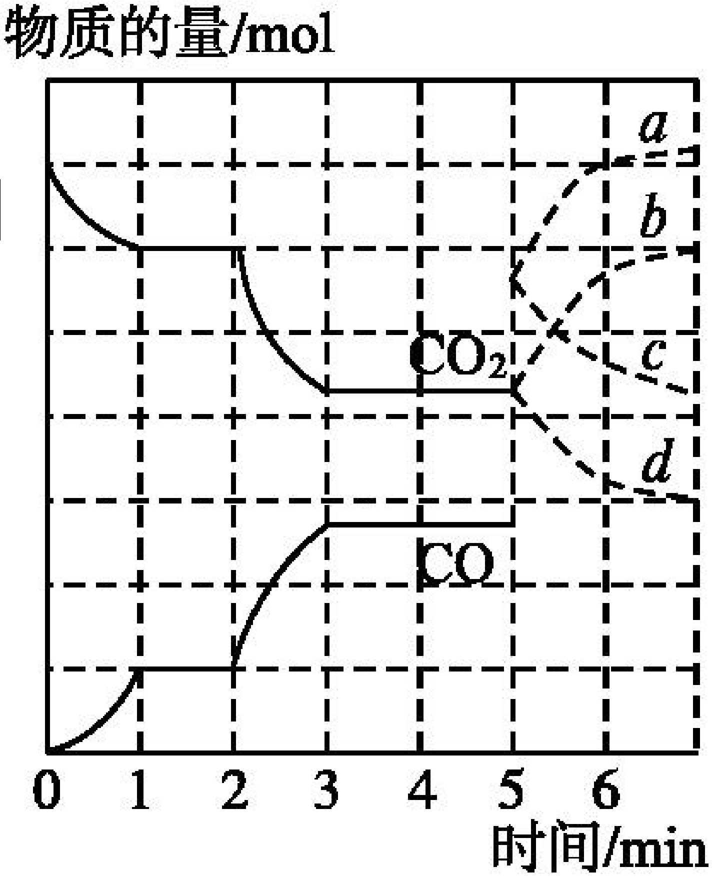
D. □□□□□□□□□□□□□□□□□□□□□

□□/°C \ □□ $c(Y)/mol\cdot L^{-1}$ \ □□/L	1	2	3
100	1.00	0.75	0.53
200	1.20	0.90	0.63
300	1.30	1.00	0.70

2. □□□□□□ 2 L □□□□□□□□□□□□□□□□

$Fe(s)+CO_2(g)\rightleftharpoons FeO(s)+CO(g)$ □□□ CO_2 □ CO □□□

□□ (mol) □□□ (min) □□□□□□□□□□



(1) □□□ 1 min □□□□□□□□□□□□□□□

□□□□ 3.2 g □□ CO_2 □□□□□□□□□□□□□

$v(CO_2)$=__0.1 mol·L^{-1}·min^{-1}__ □

(2) □□□□□ 2 min □□□□□□□□□□□□□□□

□□□□□□□□ 3 min □□□□□□□□□□ ΔH___0(□"＞""＜"□"=") >

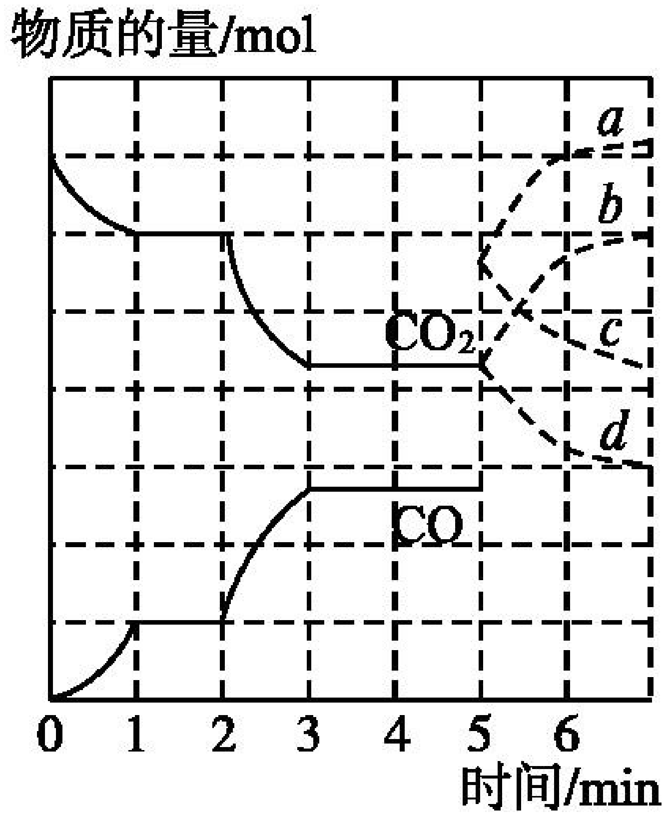
(3)5 min □□□□□□□ CO(g) □□□□□□□□□□□□□□____
_ (□□□□)　　C

A.v(□)□□□□□□　　B.v(□)□□□□□□

C.v(□)□□□□□□　　D.v(□)□□□□□□

□□ n(CO_2) □□□□□□____ (□□□□□□□□□□)　b

(4) □□□□□□□□□□□□□□□
□□□□□□□□□□□□□□□□
____________□



Fe(□FeO)□□□(□□□□□)□□□□□□ □
□□□□□□□□

[illegible]

[illegible] P_{29} [illegible]

[illegible]

[illegible] —— K

1. [illegible]

2. [illegible]

[illegible] $a\mathrm{A(g)}+b\mathrm{B(g)} \rightleftharpoons c\mathrm{C(g)}+d\mathrm{D(g)}$ [illegible]

$$K=\frac{c^{c}(C)\cdot c^{d}(D)}{c^{a}(A)\cdot c^{b}(B)}$$

[illegible] c [illegible]

K_c [illegible] K_p [illegible]

3. [illegible]

[illegible]

⇨ **K** [illegible]

[illegible] **K** [illegible] **10^5** [illegible]

[illegible] **$K<10^{-5}$** [illegible]

4. [illegible]

[illegible]1[illegible];

[illegible]2[illegible]

[illegible]3[illegible]

K[illegible]

[illegible]4[illegible]K[illegible]

[illegible] $Cr_2O_7^{2-} + H_2O \rightleftharpoons 2CrO_4^{2-} + 2H^+$

[illegible]

$$K=\frac{c^2(CrO_4^{2-})\cdot c^2(H^+)}{c(Cr_2O_7^{2-})}$$

[illegible]

1. $2SO_2(g) + O_2(g) \xrightleftharpoons{\text{[illegible]}} 2SO_3(g)$

2. $Fe_3O_4(s) + 4H_2(g \xrightleftharpoons{\text{[illegible]}} 3Fe(s) + 4H_2O(g)$

3. $FeCl_3$([illegible]) + 3KSCN ([illegible]) $\rightleftharpoons$ $Fe(SCN)_3$ ([illegible]) + 3KCl

[illegible] 5 [illegible]

[illegible] $N_2+3H_2 \rightleftharpoons 2NH_3$

$2NH_3 \rightleftharpoons N_2+3H_2$

$1/2N_2+3/2H_2 \rightleftharpoons NH_3$

① [illegible]②[illegible]①[illegible]③[illegible]

a. [illegible]

b. [illegible]

□□□

$NH_4I(s) \rightleftharpoons NH_3(g)+HI(g)\quad K_1$

$2HI(g) \rightleftharpoons I_2(g)+H_2(g)\quad K_2$

$2NH_4I(s) \rightleftharpoons 2NH_3(g)+I_2(g)+H_2(g)\quad K_3=?$

5. [illegible]

[illegible] 1 [illegible]

K [illegible]

[illegible]

[illegible]

[illegible]

[illegible] 2 [illegible]

[illegible] K [illegible] ______ [illegible]

[illegible] K [illegible] ______ [illegible]

[illegible]3[illegible]

[illegible] $mA(g) + nB(g) \rightleftharpoons pC(g) + qD(g)$ [illegible]

$$Q_c = \frac{c^p(C)\cdot c^q(D)}{c^m(A)\cdot c^n(B)}$$

(Q_c [illegible])

[illegible] Q_c [illegible] K_c [illegible] $V_{[illegible]}$ [illegible] $V_{[illegible]}$

Q_c [illegible] K_c [illegible] ([illegible]) [illegible] $V_{[illegible]}$ [illegible] $V_{[illegible]}$

Q_c [illegible] K_c [illegible] ([illegible]) [illegible] $V_{[illegible]}$ [illegible] $V_{[illegible]}$

6 [illegible]

（1 [illegible]

[illegible] $aA + bB \rightleftharpoons cC + dD$

[illegible] **A** [illegible] **α** [illegible]

$$\alpha(A) = \frac{A\text{的初始浓度} - A\text{的平衡浓度}}{A\text{的初始浓度}} = \frac{C_0(A) - [A]}{C_0(A)} \times 100\%$$

[illegible]

([illegible])

（2 [illegible] [illegible]

□□□□□□□□□□□□0.020mol/L$H_2O(g)$□0.020mol/L $CO(g)$□□□□□773K□□□□□□□□

$$CO(g)+H_2O(g) \rightleftharpoons CO_2(g)+H_2(g)$$

K=9□□CO□□□□

□□□CO□□□□□□x□□□□□□

$$CO(g)+H_2O(g) \rightleftharpoons CO_2(g)+H_2(g)$$

□□□□/(mol/L)	0.020	0.020	0	0
□□□□/(mol/L)	x	x	x	x
□□□□/(mol/L)	0.020-x	0.020-x	x	x

□□ $$K=\frac{c(CO_2)\cdot c(H_2)}{c(CO)\cdot c(H_2O)}=\frac{x^2}{(0.020-x)^2}=9$$

□□x=0.015mol/L

□□□□ $$a(CO)=\frac{0.015mol/L}{0.020mol/L}\times100\%=75\%$$

[illegible]

1. [illegible] [illegible] B

A. [illegible]

[illegible]

B. [illegible]

C. [illegible]

D. [illegible]

2. [illegible] 448℃ [illegible] $I_2(g)+H_2(g) \rightleftharpoons 2HI(g)$ [illegible]

49 [illegible]

[illegible] $2HI(g) \rightleftharpoons I_2(g)+H_2(g)$ [illegible] ____________;

$1/2\ I_2(g)+1/2H_2(g) \rightleftharpoons HI(g)$ [illegible] ________

3. [illegible]

CO_2 [illegible] g [illegible] + H_2 [illegible] g [illegible] ⇌ CO [illegible] g [illegible] + H_2O [illegible] g [illegible] K

[illegible] T [illegible]

T/℃	700	800	830	1000	1200
K	0.6	0.9	1.0	1.7	2.6

[illegible]

[illegible] 1 [illegible] K= ______ [illegible] √

[illegible] 2 [illegible] ______ [illegible]“[illegible]”[illegible]“[illegible]”[illegible]

[illegible] 3 [illegible] $c(CO_2)\cdot c(H_2)=c(CO)\cdot c(H_2O)$, [illegible] 830 ℃ [illegible] ______

[illegible] 4 [illegible] 1200 °C [illegible] CO_2 [illegible] H_2 [illegible] CO [illegible] H_2O [illegible]

2mol/L [illegible] 2mol/L [illegible] 4mol/L [illegible] 4mol/L [illegible]

______________ ([illegible]“[illegible]”[illegible]“[illegible]”) √

恒温下, 在 5L 的密闭容器中充入 2molX 气体和 1molY 气体发生反应：$2X(g)+Y(g) \rightleftharpoons 2Z(g)$；$\Delta H<0$ 。10min 后达平衡，测得容器内压强是反应前的 5/6，下列说法中错误的是（　）

A. 平衡时，X 的转化率为 50%

B. 该温度下平衡常数 K=10

C. 10min 内生成物 Z 的反应速率 $0.2mol\cdot L^{-1}\cdot min^{-1}$

D. 某一时刻，X、Y、Z 的物质的量分别是 0.4mol、0.2mol、1.6mol，此刻 $V_{正}<V_{逆}$

1 □□□□□□□□□ 2L □□□□□□□ A □□□ 1mol

N_2 □ 1mol H_2 □□□□□□□□□□□□□

N_2 (g)+ 3 H_2(g) $\rightleftharpoons$ 2 NH_3(g) □△□□ 0 □□□

□□□□□□□□□□□□□□□□□□□ 0.4mol □

12.5

□ 1 □□□□□□□□□□ K □□________□

□ 2 □□□□□□□□□□□□□□ 1L □□□□□

B □□□□□□□□□ 2mol □ 1mol □ 1mol □□

N_2 □ H_2 □ NH_3 □□□ , □□□□□□□□□□□

□ □

___(“ □”□“□”) □□□□___□□□□□

□□

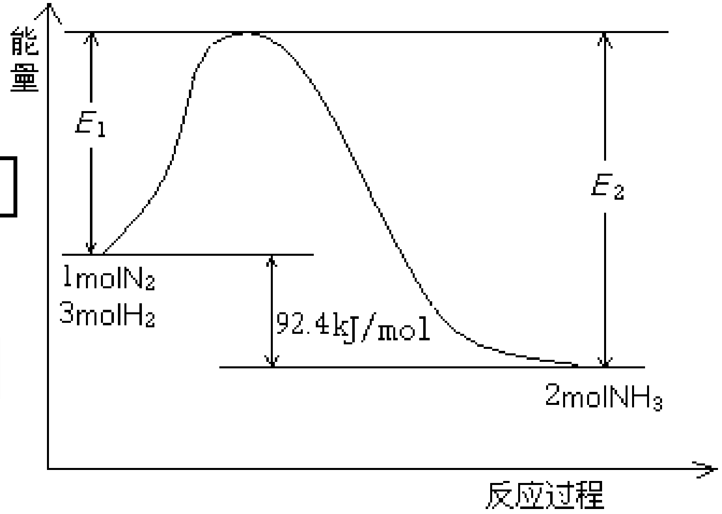
□ 3 □□□□ A □□□□□□□□□ K □ ________________

□□“□□”□“□□”□“□□”□

2. □□□□□□□□□□□

$N_2(g)+3H_2(g) \rightleftharpoons 2NH_3(g)$ $\Delta H = -92.4\ kJ/mol$

□□□□□□□□□□□□



① □□□□□□□□□□□□□□□□□ E_2 □□□□□

__________□□□“□□”□“□□”□“□□”□□ □□

② □□□□□ $N_2(g)$ □ $H_2(g)$ □□ 2L □□□□

□□□□ 500°C □ 2×10⁷Pa □□□□

5 □□□□□□□□□□ N_2 □ 0.2 mol □ H_2 □ 0.6 mol □ NH_3 □

0.2 mol □□□□□□□□□ $v(N_2)$ □ __0.01mol·L□1·min□1__ □

H_2 □□□□□ __33.3%__ □□□□□□□□□□□□□□□__________

__3.7 (mol/L)$^{-2}$__ □□□□□□□□□□□□ □

③ □□□②□ H_2 □□□□□□□□□□□□__________□ A D

A □□□□□

B □□□□□□□□□□□

C □□□□□□□□□

D □□□□□□□□□□

3. CO_2

$C(s)+CO_2(g) \rightleftharpoons 2CO(g)$

P = P ×

B

A 550°C υ υ

B 650°C CO_2 25.0%

C T°C CO_2 CO

D 925°C

K_P=24.0P

4.(2018·[illegible]) [illegible] 1.00 L [illegible]

N_2O_4 [illegible] $N_2O_4(g) \rightleftharpoons 2NO_2(g)$ [illegible]

[illegible]

[illegible]❄●

(1) [illegible] ΔH ______ 0 [illegible]

[illegible]

100 °C [illegible]

[illegible]

[illegible] K_1 [illegible] ___0.36___ [illegible]

(2)100 °C [illegible] T [illegible] $c(N_2O_4)$ [illegible] 0.0020 $\text{mol}\cdot\text{L}^{-1}\cdot\text{s}^{-1}$ [illegible] 10 s [illegible]

① T ______ ([illegible]"[illegible]"[illegible]"[illegible]")100 °C [illegible]

[illegible]

______________________________ [illegible]

[illegible]

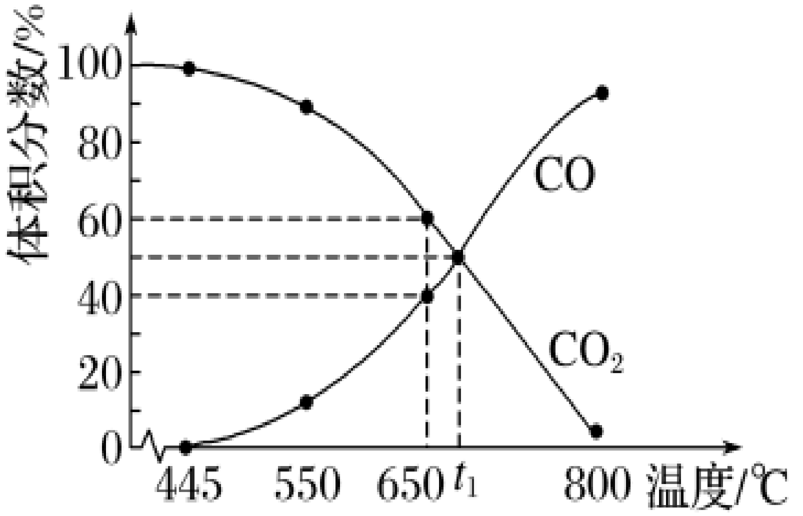
⇌

>   >

B

一定量的 CO_2 与足量的 C 在恒压密闭容器中发生反应：

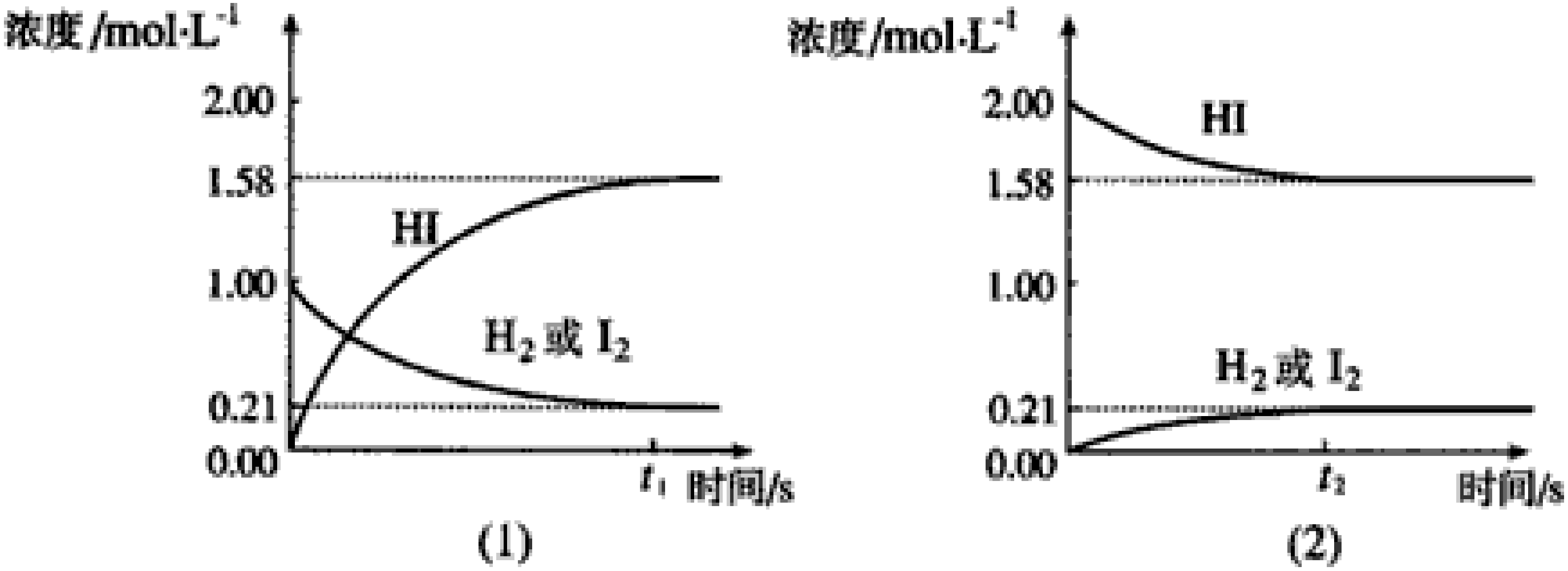
$C(s)+CO_2(g)$　　$2CO(g)$　$\Delta H=+173\ kJ\cdot mol^{-1}$，若压强为 p kPa，平衡时体系中气体体积分数与温度的关系如图所示，回答下列问题：



(1)650 ℃时 CO_2 的平衡转化为 __25%__。

（2）t_1 ℃时平衡常数 K_p = __0.5p__ (用平衡分压代替平衡浓度计算，分压＝总压×物质的量分数)；该温度下达平衡后若再充入等物质的量的 CO 和 CO_2 气体，则平衡 __不__ (填“正向”“逆向”或“不”)移动，原因是 __$Q_p=K_p$__。

425°C 1 $H_2(g)+I_2(g) \rightleftharpoons 2HI(g)$



[illegible]

1. [illegible]

[illegible]

- [illegible]①[illegible] **T** [illegible] **V** [illegible]

②[illegible] **T** [illegible] **P** [illegible]

$$2H_2 + O_2 \rightleftharpoons 2H_2O$$

	$2H_2$	O_2	$2H_2O$
$n_{[illegible]1}$(mol)	2	1	2
$n_{[illegible]2}$(mol)	4	2	4

2. □□□

□1□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□
□□□□□□(□□□n□c□P□□□□□

□□□□□ $2SO_2$ (g) + O_2(g) ⇌ $2SO_3$ (g)

	$2SO_2$ (g)	O_2(g)	$2SO_3$ (g)
n_{01}(mol)	2	1	0
n_{02}(mol)	0	0	?
n_{03}(mol)	1	?	?
n_{04}(mol)	a	b	c

□□4□a□b□c□□□□□□□□□□□□□□□□□1□□□
□□?

a+c=2

b+1/2c=1

a:b=2:1

[illegible] 2 [illegible] n [illegible] c [illegible] P [illegible]

[illegible]

$$H_2 + I_2 \rightleftharpoons 2HI$$

		H_2	I_2	$2HI$
[illegible] 1 [illegible]	n_{01}(mol)	1	2	0
[illegible] 2 [illegible]	n_{02}(mol)	2	4	0
[illegible] 3 [illegible]	n_{03}(mol)	0.25	1	?

□□□□

$H_2 + I_2 \rightleftharpoons 2HI$

□□1□□: n_{01}(mol)　1　2　0

□□2□□: n_{02}(mol)　2　4　□□□□

□□1: 1mol H_2, 2mol I_2 —(□T □□V)→ H_2 x mol, I_2 y mol, HI zmol

□□2: 2mol H_2, 4mol I_2 —(□T □□V)→ H_2 ?, I_2 ?, HI ?

□□□□□□

2mol H_2, 4mol I_2 —(□T, □V)→ | H_2 x mol, I_2 y mol, HI z mol | H_2 x mol, I_2 y mol, HI z mol | —(□□□□P, □□; □□□□□)→ H_2 2x mol, I_2 2y mol, HI 2zmol

[illegible]

[illegible]

[illegible]： $2SO_2(g) + O_2(g) \rightleftharpoons 2SO_3(g)$

	$2SO_2(g)$	$O_2(g)$	$2SO_3(g)$
n_{01}(mol)	2	1	0
...ol)	4	2	?

[illegible] 1: 2mol SO_2, 1mol O_2 —— [illegible] T [illegible] V ——→ [illegible]: SO_2 x mol, O_2 y mol, SO_3 zmol

[illegible] 2: 4mol SO_2, 2mol O_2 ——→ [illegible]: SO_2 x mol | SO_2 x mol; O_2 y mol | O_2 y mol; SO_3 zmol | SO_3 zmol

—— [illegible] P [illegible] / [illegible] ——→ SO_2 <2x mol, O_2 <2y mol, SO_3 >2zmol

(3) [illegible] ([illegible] c [illegible] p [illegible] n [illegible]) [illegible]

[illegible]： $2SO_2(g) + O_2(g) \rightleftharpoons 2SO_3(g)$

	$2SO_2$	O_2	$2SO_3$
n_{01}(mol)	2	1	0
...ol)	4	2	

[illegible] 1: 2mol SO_2, 1mol O_2 → [illegible] T [illegible] P → [illegible]: SO_2 x mol, O_2 y mol, SO_3 zmol

[illegible]

[illegible] 2: 4mol SO_2, 2mol O_2 → (SO_2 x mol, O_2 y mol, SO_3 zmol) + (SO_2 x mol, O_2 y mol, SO_3 zmol) → SO_2 2x mol, O_2 2y mol, SO_3 2zmol

□□□□□

□1□□□□□ $H_2 + I_2 \rightleftharpoons 2HI$

	H_2	I_2	$2HI$
n_{01}(mol)	1	2	0
n_{02}(mol)	2	4	0

α(H_2)□

□2□□□□□ $H_2 + I_2 \rightleftharpoons 2HI$

① 1 mol　　2 mol　　0

② □□□□□□□□□ H_2 □ α(H_2) □ α(I_2) □

□□□□□□□□□□□□□□□□□□□□□□□□□□
□□□□□□□□□□□□□□□□□□□□□□□□

□3□□□□□ $2HI \rightleftharpoons H_2 + I_2$

① 2 mol　　0　　0

② □□□□□□□□□ HI □ α(HI) □

□□□

$$2SO_2(g) + O_2(g) \rightleftharpoons 2SO_3(g)$$

	$2SO_2(g)$	$O_2(g)$	$2SO_3(g)$
①T,V	2	1	0
②T,V	4	1	0
③T,V	4	2	0
④T,P	2	1	0

(□□V□①□□)

② □□□①□ $\alpha(SO_2)$ □ ↘ $\alpha(O_2)$ □ ↗

③ □□□①□ $\alpha(SO_2)$ □ ↗ $\alpha(O_2)$ □ ↗

④ □□□①□ $\alpha(SO_2)$ □ ↗ $\alpha(O_2)$ □ ↗

$$N_2O_4 \rightleftharpoons 2NO_2$$

① [illegible] **2mol N_2O_4** [illegible]
[illegible] **N_2O_4** [illegible] ______ [illegible] [illegible] ([illegible]“[illegible]”[illegible]“[illegible]”[illegible]“[illegible]”) [illegible] $\alpha(N_2O_4)$________ [illegible] ([illegible]“[illegible]”[illegible]“[illegible]”[illegible]“[illegible]”)

② [illegible] **2mol NO_2** [illegible]

a. [illegible] ________ [illegible] **(**[illegible]**“**[illegible]**”**[illegible]**“**[illegible]**”**[illegible]**“**[illegible]**”)** [illegible]

b. [illegible] ________ **(**[illegible] [illegible]**“**[illegible]**”**[illegible]**“**[illegible]**”**[illegible]**“**[illegible]**”)** [illegible]

c. [illegible] ________**(**[illegible]**“**[illegible]**”**[illegible]**“**[illegible]**”**[illegible]**“**[illegible]**”)**

[illegible]

[illegible] $aA(g) \rightleftharpoons bB(g)+$
$cC(g)$ [illegible] A [illegible]
[illegible]

[illegible]1[illegible] $a=b+c$ [illegible] A [illegible] __________ ([illegible]
[illegible])

[illegible]

[illegible]2[illegible] $a>b+c$ [illegible] A [illegible] __________

[illegible]3[illegible] $a<b+c$ [illegible] A [illegible] __________

[illegible]

[illegible]

[illegible]

1. [illegible]2molA[illegible]1molB[illegible]
$\mathbf{2A(g)+B(g)\rightleftharpoons xC(g)}$ [illegible]C[illegible]W%[illegible]
[illegible]
A[illegible]0.6mol[illegible]B[illegible]0.3mol[illegible]C[illegible]1.4mol[illegible]
[illegible]C[illegible]W%[illegible]x[illegible] [illegible] **C**

A [illegible]2

B [illegible]3

C [illegible]2[illegible]3

D [illegible]

一定温度下，在 3 个体积均为 **1.0 L** 的恒容密闭容器中发生如下反应，$2H_2(g)+CO(g) \rightleftharpoons CH_3OH(g)$ 达到平衡。下列说法正确的是（　　）

容器	温度/K	物质的起始浓度/mol·L^{-1}			物质的平衡浓度/mol·L^{-1}
		$c(H_2)$	$c(CO)$	$c(CH_3OH)$	$c(CH_3OH)$
Ⅰ	400	0.20	0.10	0	0.080
Ⅱ	400	0.40	0.20	0	
Ⅲ	500	0	0	0.10	0.025

A．该反应的正反应吸热

B．达到平衡时，容器I中反应物转化率比容器II中的大

C．达到平衡时，容器II中 $c(H_2)$大于容器III中 $c(H_2)$的两倍

D．达到平衡时，容器III中的正反应速率比容器I中的大

3. □□□□□□□□□□□□□□□□□□□□□□□□3LA□2LB□
□□□□□□□

3A□g□+2B□g□ $\rightleftharpoons$ xC□g□+yD(g)□□□□
□□C□□□□□□m%□□□□□□□□□□□□

0.6LA □0.4LB□4LC□0.8LD□□□□□□□□□□□□
□□□□□□□C□□□□□□□m%□□X□Y□□□□□

[ ]

A□x=3 y=1　　　　B□x=4 y=1　　　　CD

C□x=5 y =1　　　　D□x=10 y=2

4. [illegible] $2SO_2(g)+O_2(g) \rightleftharpoons 2SO_3(g)$ [illegible]△H=-196.6kJ/mol[illegible]

[illegible] 3 [illegible]

[illegible]

[illegible]	[illegible]	[illegible]	SO_2 [illegible]	[illegible]	[illegible]
[illegible]	2mol SO_2 1mol O_2	α_1	C_1	[illegible] a kJ	V_1
[illegible]	2mol SO_3	α_2	C_2	[illegible] b kJ	V_2
[illegible]	4mol SO_3	α_3	C_3	[illegible] c kJ	V_3

(1) [illegible] α_2 __=__ α_3 ([illegible]"<"[illegible]">"[illegible]"=")

(2) V_1[illegible]V_2[illegible]V_3 [illegible] __$2V_1=2V_2=V_3$__

(3) a[illegible]b [illegible] __a+b=196.6__